

UNIVERSITY OF NOTRE DAME

PHASE-CHANGING IONIC LIQUIDS

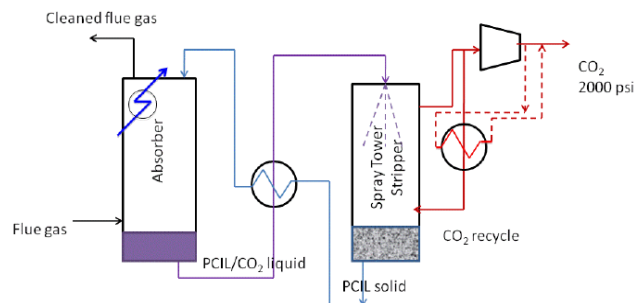
PROJECT TITLE:	CO ₂ Capture with Ionic Liquids Involving Phase Change		
ORGANIZATION:	The University of Notre Dame	LOCATION:	Notre Dame, IN
PROGRAM:	IMPACCT	ARPA-E AWARD:	\$2,559,562
TECH TOPIC:	Carbon Capture	PROJECT TERM:	7/1/10 – 6/30/13
WEBSITE:	http://energy.nd.edu/		

CRITICAL NEED

Coal-fired power plants provide nearly 50% of all electricity in the U.S. While coal is a cheap and abundant natural resource, its continued use contributes to rising carbon dioxide (CO₂) levels in the atmosphere. Capturing and storing this CO₂ would reduce atmospheric greenhouse gas levels while allowing power plants to continue using inexpensive coal. Carbon capture and storage represents a significant cost to power plants that must retrofit their existing facilities to accommodate new technologies. Reducing these costs is the primary objective of ARPA-E's carbon capture program.

PROJECT INNOVATION + ADVANTAGES

Notre Dame is developing a new CO₂ capture process that uses special ionic liquids (ILs) to remove CO₂ from the gas exhaust of coal-fired power plants. ILs are salts that are normally liquid at room temperature, but Notre Dame has discovered a new class of ILs that are solid at room temperature and change to liquid when they bind to CO₂. Upon heating, the CO₂ is released for storage, and the ILs re-solidify and donate some of the heat generated in the process to facilitate further CO₂ release. These new ILs can reduce the energy required to capture CO₂ from the exhaust stream of a coal-fired power plant when compared to state-of-the-art technology.



IMPACT

If successful, Notre Dame's special ILs would enable the reduction of significant greenhouse gas emissions while helping to position the U.S. as a global industry leader in carbon capture and storage technology.

- **SECURITY:** Enabling continued use of domestic coal for electricity generation will preserve the stability of the electric grid.
- **ENVIRONMENT:** Carbon capture technology could prevent more than 800 million tons of CO₂ from being emitted into the atmosphere each year.
- **ECONOMY:** Improving the cost-effectiveness of carbon capture methods will minimize added costs to homeowners and businesses using electricity generated by coal-fired power plants for the foreseeable future.
- **JOBS:** Retrofitting coal-fired power plants to capture and store carbon dioxide could create jobs in the U.S. manufacturing, construction, and engineering sectors.

CONTACTS

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